Remarks

As to the rejection, in Office Action Summary received in June 2007, to my claim 1 under 35 U.S.C. 102(b) as being anticipated by Hirai et al (U.S.P.N. 4990311), I state my objections to the action because the examiner were comparing apple and tomato and over interpreted Hirai's method. Hiral's patent does not have any inherent feature which covers my invention not be recognized at the time of his invention.

First, the difference is that Hirai and I use different theories to reach different goals. And Hirai's UV rays are not my UV rays. My invention use UV radiation theory to kill microorganisms in air directly, which employs UV rays at about 253.7nm wavelength (my application, summary of invention, paragraph [0013]) known as the best UV rays for killing microorganisms by irradiation in all UV rays.

Hiral's method uses ozone theory to deodorize air, which employs UV rays at about 185 nm wavelength to generate ozone (Hiral's patent, Background of the Invention, line 5 and Description of the Preferred Embodiments, column 3, line 14) known as the best UV rays for producing ozone but with much weaker killing power to microorganisms than 253.7nm UV rays. Thus Hiral's method has weaker irradiating killing power to microorganisms than any prior art methods using 253.7nm UV light cited in my application.

Second, the sterilizing chamber in my invention interiorly has different shape from the one in Hiral's method. My invention employs a circuitous chamber interiorly constructed as continually circuitous tunnel(s) by interior wall (my application figure 1 to 6:9) to contain said air. The circuitous chamber in my method not only guarantee that all part of said air will synchronously go through it in similar path and similar distance, but also that all part of said air evenly exposed to designated amount of UV radiation.

Hiral's method uses a rectangle chamber (which should not be considered as circuitous chamber, Hiral's patent, figure 5:73) to contain the fluent material. When the fluent material goes through the chamber each portion of the said material will actually travel with very different path and very different distance and stay very different time in the chamber before discharging through a connecting duct (Hiral's patent, figure 5:85). Most of the said material will flow, following the shortest path, directly from lower part of diffuser to connecting duct into second rectangle chamber (figure 5:74). With Hiral's method, only small portion of said material, like the examiner said, "flowing in the upper part of diffuser plate 41 in chamber 71 then the gas flows downward through connecting duct 81 ..." Some of said material flows in the upper part of diffuser plate will swirl in the upper of the chamber for a very long time. So, each portion of the said material does not travel equally in time and in distance, which results in the uneven exposure to the UV radiation. Then, the effectiveness of sterilization is even poorer.

Third, in my invention, the interior circuitous tunnel(s) of the chamber offers a flexible infrastructure for installing designated number of UV lamps. The length of and/or the number of turns in the chamber can be changed to accomplish the sterilization target. In the preferred embodiment of my invention (figure 2), ninety-eight UV lamps are employed offering more than 3000W of purer 253.7nm UV power to sterilize 5000cfm air. However, Hiral's method does not have such infrastructure.

Fourth, in my application, "in large volume" means 300 cfm to 30000 cfm. The preferred embodiments shown in FIG. 1 to 6 are capable to sterilizing 5000cfm air with microorganisms killing rate higher than 99.99%. The average travel time for the fluent material within the circuitous chamber is less than two seconds. But with Hiral's method, it only deal with very little amount of fluent material (0.07cfm) [2 liters/min, Hiral's patent, column 4, Experimental Examples, line 23] in a long time since using ozone to deodorize air needs time. So, it is not true to interpret that Hiral's method can sterilize air in large volume and as efficient as my invention.

Fifth, in my invention, since non-ozone germicidal lamps are used (my application, Detailed Description, paragraph [0047], line 9) as the source of 253.7 nm UV ray, there should be no ozone generated theoretically. The comprised catalytic ozone filter in the outlet filter is just for the trace amount of ozone generated by application using some low-end UV lamps. It does not play an important role in my invention and it is usually omitted in actual applications. (For clear understanding, I have canceled relative description from specification and claims.) On the opposite, in Hiral's method, the catalytic filter is the key component as there is plenty of ozone generated on purpose in the first chamber needed to be decomposed.

In conclusion, the differences in theory, the differences in wavelength of UV ray, the differences with interior shape of the chamber, the differences of UV irradiation amount, the differences in air volume deal with, the differences in the purpose of the inventions and especially the differences in effectiveness of sterilizing air make my invention distinct from Hiral's method. In all these crucial fields, my invention is totally different from Hiral's method. And there will not be any scientific evidence to show Hiral's method can be used to sterilizing air with volume as large as my invention and as efficient as my invention. Hence, Hiral's patent does not have any inherent feature which covers my invention not be recognized at the time of his invention. Thus, MPEP 2112, II should not be applied.

I believe that my amendments will make my invention more distinguish from U.S.P.N. 4990311.

(The end)